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THE THEORETICAL DESCRIPTION FOR CADMIUM ELECTROCHEMICAL DETERMINATION AND REMOVAL FROM WASTEWATER BY HYDROQUINONIC COMPOUNDS

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The elements of II B group of the Periodic table are among the most used by people. Among them, cadmium and its salts were once used to produce yellow dyes for different purposes. On the other hand, all of the metals of this group are considered "heavy metals" and possess high toxicity, if its concentration exceeds the limit. Cadmium is especially toxic, damaging lungs and kidneys, which may cause death. Moreover, it is considered toxic for the environment. For this reason, the development of an efficient method for the quantification, removal and recuperation of cadmium cation is really up to date, and the electrochemical techniques may be suitable for both purpose.

Complex formation with organic complexons, including dyes and phenolic compounds, is frequently used for cadmium extraction by either cathodic or anodic way. In the cathodic process it augments the efficiency of the metal deposition, reducing the cathodic current and/or module of potential applied to the cathode. Yet in the anodic process, it provides the possibility of complex compound electropolymerization, which will recuperate the metal cation into an economic and green material (Fig. 1).

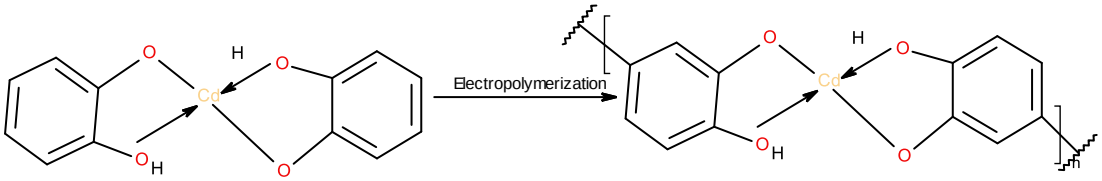

Fig. 1. Cadmium phenolic complex electropolymerization

Two models for cathodic and anodic deposition have been investigated by means of linear stability theory and bifurcation analysis. It was proven than for the electroanalytical purposes the cathodic electrochemical determination is more suitable. Yet for the retention and recuperation purposes, anodic process is much more interesting, due to the efficient polymeric material formation.

Either way, the stable steady-state is easy to obtain and maintain in both of the processes.